

# Capgras Syndrome: A Review of the Neurophysiological Correlates and Presenting Clinical Features in Cases Involving Physical Violence

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**Objective:** Acts of violence have been frequently reported in cases of Capgras syndrome (CS), a misidentification syndrome characterized by the delusional belief that imposters have replaced people familiar to the individual. CS has been observed in many neuropsychiatric and organic disorders, and neuroimaging studies indicate an association between CS and right hemisphere abnormalities. However, CS has received limited attention from a forensic psychiatric perspective. We propose that elucidating demographic and clinical features noted in cases of violence secondary to CS may highlight important factors in the progression of CS to violence.

**Method:** We review the neurophysiological correlates and clinical factors observed in CS and present characteristics of a series of cases that demonstrate the potential of CS patients for severe physical violence toward the misidentified person.

**Results:** For patients with CS involving assault, we present and discuss commonly reported demographic and clinical features that may contribute to an increased risk for violence.

**Conclusions:** An understanding of the presenting clinical features of CS resulting in aggressive acts may assist clinicians to assess the potential for violence in these patients. (Can J Psychiatry 2004;49:719–725)

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## Clinical Implications

- Describing specific demographic and clinical characteristics of patients with Capgras syndrome (CS) who exhibit physical violence may assist in the forensic psychiatric assessment of their risk for violence.
- Early detection of the risk for violent behaviour may improve the clinical outcome of patients with CS and increase the potential safety of people close to these patients.
- Our findings are a preliminary step in furthering understanding of the causes of violent behaviour in patients with psychotic disorders.

## Limitations

- The small number of subjects and the design's retrospective nature limit the generalizability of our findings.
- There remains a need to confirm reports of an association between violent behaviour and specific demographic and clinical characteristics of patients with CS.
- There are no clear criteria for forensic psychiatric evaluation of violent behaviour in patients with CS.

**Key Words:** Capgras syndrome, delusional misidentification, violence

Capgras syndrome (CS) is a common type of delusional misidentification syndrome, that is, the false belief in doubles and duplicates (1). It is characterized by the delusional belief that someone significant or well known to an individual, usually a close relative or family member, has been replaced by an imposter with a strong physical resemblance (2). The individual with CS recognizes the close relation but denies his or her identity and often uses subtle misperceived differences in behaviour, personality, or physical appearance to distinguish between him or her and the imagined impersonator (2–5). CS may be transient or persistent and often includes more than one subject of misidentification (6–9). The delusion can recur, with the number of imagined imposters increasing over time (10). The occurrence of CS has been reported among individuals of various ethnic backgrounds (11–17) and across a wide range of ages (14,17–24). The syndrome is exhibited in both sexes, although some authors have reported a higher prevalence among women (3,22,25–27).

CS has been associated with various neuropsychiatric conditions, organic illnesses, and neurological disorders. It is estimated to occur in up to 4% of psychosis patients (5,28–30) and has been observed mostly in patients with schizophrenia, especially of the paranoid subtype (for example, 3,31–34). CS has also been noted in patients with schizoaffective disorder (35–37) and affective disorder (33,38). There are indications that CS occurs in as many as 20% to 30% of patients with Alzheimer's disease (14,36,39,40). The delusion is associated with epilepsy (41,42), pituitary tumour (43,44), severe closed head injury (2,4), cerebrovascular disease (45,46), dementia with Lewy bodies (47), multiple sclerosis (48), Parkinson's disease (49,50), and AIDS (51). CS has also been linked to alcoholism (52,53), lithium toxicity (54,55), and migraine (52,56).

As the term Capgras syndrome is descriptive and does not denote a well-defined mental disorder, various etiologies have been proposed for the condition's development. CS has been studied from perspectives that focus on the relative importance of functional and organic contributions, and the literature must be interpreted in that context. Because initial reports of CS involved patients with psychiatric illness and their close relations, early explanations of the delusion were predominately psychodynamic interpretations. These explanations included suggestions that CS might develop out of oedipal issues in women as a defense against hostility or incestuous desires (57,58) or out of latent homosexuality in men (59). Later attempts to account for CS resulted in hypotheses of anxiety-induced regression of cognitive and emotional functioning (2), pathological splitting of internalized object representations (32), inadequately repressed conflicting or ambivalent feelings toward the implicated person (for

example, 26 and 60), and the projection of negative emotions arising from these conflicting feelings (32).

Reports of an association between CS and medical and neurological conditions have led to the belief that cerebral dysfunction underlies the delusion's development. The syndrome has been linked to dopaminergic overactivity (61–63), and serotonin abnormality has been implicated in some (54) but not all studies (55,64). Similarly, reduced platelet monoamine oxidase activity has been noted by some (65) but not by others (66).

Results of structural and neuroimaging studies of CS provide support for an organic etiology. Neuroanatomical evidence shows that lesions of the right hemisphere are common among patients with CS, although bilateral damage has been found in most patients (4,46,53,67–69). While pathology can be widespread, lesions have been found mainly in the frontal (42,69–72), temporal, and (or) parietal lobes (4,23,42,70–72). Using CT, Joseph and others found more extensive bilateral frontal and temporal cortex atrophy in schizophrenia patients with CS, compared with schizophrenia patients without the syndrome (73). Other studies using CT found global brain atrophy in combination with right hemisphere lesions in patients with dementia and CS (14,20,46,74). Mentis and others reported that positron emission tomography (PET) showed abnormal brain glucose metabolism in paralimbic structures and temporal lobes of patients with Alzheimer's dementia comorbid with CS and other delusional misidentification syndromes (75). Neuropsychological research supports a relation between CS and right frontal and temporal lobe abnormalities: numerous reports indicate that patients with CS tend to have lower scores on neuropsychological tests of frontal lobe function (8,39,69,76–79).

While many reports have proposed cerebral dysfunction in the etiology of CS, evidence of neuropathology falls short of explaining how the condition arises. The relatively higher frequency of occurrence of right hemisphere lesions in CS, compared with damage to the left side, has led to neuropsychological explanations that have focused on right hemispheric impairments in facial processing. Joseph theorized that a delusion of doubles occurs because of a failure to adequately integrate left and right hemispheric processing of known faces (70). However, this model is not supported by results of a tachistoscopic study showing that CS patients view visual stimuli presented unilaterally faster than stimuli presented bilaterally (7). Other explanations have focused on specific impairments in processes of face memory and face recognition. Staton and others suggested that CS arises when right hemisphere dysfunction causes a memory disconnection that leads to a failure to integrate new information with representations about a significant individual stored over time (80). Cutting theorized that CS arises secondary to right

hemispheric damage that creates an inability to access memories for individual faces (29,67). While at least one tachistoscopic study supports this theory, it has been noted that Cutting's model does not account for the selectivity inherent in CS delusions of misidentification (7).

Similarities have been noted between CS and prosopagnosia, a neurological condition associated with right hemisphere damage and characterized by impairment of familiar face recognition (2,42,81–85). Prosopagnosia involves damage to right ventromedial occipitotemporal areas that are important in conscious recognition of faces according to associated memory cues (85). It has been suggested that CS may result from disruption of pathways connecting the face-processing areas of the inferior temporal cortex and limbic structures, which mediate the generation of affective responses accompanying face recognition (86–88). Some evidence has emerged in support of this model. PET studies of patients with Alzheimer's disease and CS that revealed bilateral cortical abnormalities were interpreted as indications of dysfunctional connections among frontal, paralimbic, and association areas (75,89). Similarly, neuroimaging and autopsy studies of patients with CS and dementia with Lewy bodies revealed the presence of multiple lesions in the visual and occipital association cortices and in frontal and parietal white matter, suggesting the disruption of connections from face-processing areas of the temporal lobe to the limbic system (72,90,91). While much research has linked CS to dysfunction in cerebral areas involved with processing of visual information for facial recognition, reports of CS in blind patients suggest that the misinterpretation of senses other than vision is involved in this phenomenon (50,92,93).

## Violence Secondary to Capgras Syndrome

Epidemiologic studies have indicated a modest relation between interpersonal violence and the presence of an active psychotic disorder (94–104), with a higher incidence of severe acts of violence in delusional disorders, compared with other psychiatric disorders (103–106). In a study of incident cases of schizophrenia in a London borough over a 20-year period, Wessely and others found that men with schizophrenia were nearly 4 times more likely to commit violent offences (101). Shah and others found that, of 718 homicide convictions, 38% involved psychosis, with 6% having a lifetime history of schizophrenia (95). In a Finnish study that examined data on 1423 homicide offenders over a 12-year period, Eronen and others found that 93 (6.5%) suffered from schizophrenia (102). Calculations of the odds ratios (ORs) revealed that the risk of committing a homicide was about 10 times greater among men and women with schizophrenia, compared with the general population. Eronen and others also examined 693 homicide offenders with mental disorders over an 8-year

period and found that schizophrenia increased the OR of homicidal violence by approximately 8 times in men and 6 times in women (103). Nearly one-half of the 63 offenders with schizophrenia suffered from the paranoid subtype. In contrast, the presence of affective disorder, anxiety disorder, dysthymia, or mental retardation did not significantly increase the OR.

Numerous reports exist of cases of violent behaviour in CS sufferers (for example, 13,107–117). We summarize 4 cases involving CS and severely violent acts; these add to a growing number of reports indicating that individuals with CS can pose significant danger to others (13,108,109,113,114,117,118). The individuals in our case series had a court-ordered psychiatric assessment and were evaluated either in a detention centre or in a forensic assessment unit. Psychiatric diagnoses were made according to DSM-IV criteria (119). CS was defined either as the delusional belief that imposters replaced people familiar to the individual or as a delusion of misidentification directed at the individuals themselves (120). Demographic data and information pertaining to delusional content and dangerous behaviours were collected and verified through clinical interviews and a review of medical charts, crown brief synopses, preliminary hearings, court transcripts, and newspaper reports. Each individual gave informed consent for the interview, the review of the file, and the production and entry of a report as an exhibit in court, where it became public. Confidentiality was waived with respect to the information contained in the clinical vignettes.

### *Summary of Cases*

The individuals in our case series were men who committed severe acts of violence, including homicide, toward family members. Following the violent act, each man was diagnosed with some form of psychosis, including schizophrenia, paranoid subtype. All 4 held delusions of misidentification and directed the violent act(s) toward the misidentified person(s). For each individual, there was evidence of persistent and long-standing delusional ideas of persecution and (or) paranoid ideation. The presence of auditory hallucinations of a commanding nature was noted in 2 of the men. On examination of their mental status, 3 individuals demonstrated a blunted affect. Two of the men displayed sexual preoccupations, with one questioning his sexual orientation and both holding beliefs of past sexual abuse. While all the men had a history of substance abuse, only one had a previous psychiatric disorder.

One of the men demonstrated a variant of CS in which a delusion of misidentification is directed at the patient himself or herself. Such misidentification of self can pose a danger to others, as this form of CS often includes a delusional component of grandiosity in which patients see themselves as

powerful figures. As with the individual noted here, these patients may commit violent acts because they think that others want to deprive them of their special powers or envy their powers (117). The other 3 individuals demonstrated the delusion of misidentification of others, resulting in acts of violence. Attempts to physically harm the misidentified person are believed to stem from the patient's belief that the imagined imposter in some way threatens his or her welfare (114). Because patients no longer view the misidentified person as someone they are close to, aggressive behaviour may be facilitated; delusions of misidentification may thus increase the risk of violent acts.

Despite numerous reports of assault associated with CS, the propensity to violence cannot be attributed solely to the delusion's existence. Other factors are likely to influence the possibility of violent action. While the progression of CS to severely violent acts has received little forensic investigation, a literature review uncovered several demographic and clinical features that may be important in the evaluation of the potential for violent behaviour in patients with CS.

In their national survey of homicide convictions, Shaw and others reported that, in over 270 convictions involving psychosis, most of the victims were family members (104). Nestor and others found a higher incidence of CS in forensic psychiatric patients with psychotic disorders who had committed homicide or other severely violent acts, compared with less violent patients (106,121). Of 23 homicides, 21 involved family members, consistent with our cases and with other findings that victims of CS violence are often family members (83,105,107,110,113,114,118,122–127). Because most victims of violent acts by CS patients live with the delusional individual (111), the risk of violence is further heightened. Consistent with our 4 cases, most of the case reports of CS patients exhibiting violent behaviour describe male patients (83,107,110,114,118,122–128). Also consistent with our 4 cases are indications that CS delusions often exist for some time before they are acted on and that the ensuing violence is usually well planned (13,105). In cases of unrelenting CS, the potential for assault is likely increased.

When evaluating the risk for violent behaviour in CS patients, a mental status examination may indicate the presence of pertinent clinical features. CS is generally associated with suspiciousness or paranoid ideation directed toward the misidentified person: delusional ideas of persecution are commonly reported in CS (3,13,114,123) and were present in the individuals described in our series. Auditory hallucinations may be present, some of which command the patient to physically harm others (114). Affective state may be an important clinical feature in evaluating the potential for violence among patients with CS. There are frequent reports of patients showing strong feelings of hostility toward the imagined imposter

(26,117,129). Kennedy and others found that patients who had committed violent or threatening acts demonstrated fear and anger toward the misidentified person (130). By contrast—as in 3 of our 4 cases—patients tend to demonstrate a blunted affect or emotional distance toward the person believed to have been replaced (26,117,129) and appear emotionally detached when speaking of their violent action (13).

Consistent with many reported cases of CS that result in violent behaviour (13,114,116), 1 of the 4 cases noted here involved previous impulsive and (or) aggressive behaviour independent of the patient's delusional misidentification. As noted for 3 of the individuals in our series, social withdrawal or self-isolation prior to aggressive acts is commonly reported in CS patients (13,129,131). Numerous reports exist of sexual preoccupation in CS patients who have performed violent acts toward misidentified others (5,17,113,114,117,122,123); these include beliefs of past sexual abuse, as noted in 2 of our 4 cases.

People with psychiatric disorders often have cooccurring substance use disorders (132,133). Epidemiologic data indicate that substance abuse and psychosis increase the risk for violent behaviour (94,100,102). Eronen and others found that schizophrenia with alcoholism increased the OR of committing homicide by about 17 times in men and by more than 80 times in women (102). The history of substance abuse demonstrated by each of the individuals in our series is consistent with other reports of previous alcohol and other drug abuse demonstrated in CS (106,117,134,135).

To summarize, a review of the literature suggests that several demographic and clinical features common to CS may influence the likelihood of physical violence. Victims of CS violence are usually misidentified family members living with the patient. Most individuals with CS who have committed interpersonal violence are men with persistent and relatively long-standing delusions as well as a history of aggressive behaviour and (or) substance abuse. Social withdrawal or isolation prior to the violent act is common, and the violence is usually well planned. Sexual preoccupation may exist, paranoid ideation and delusions of persecution are usually evident, and commanding auditory hallucinations may be present. Hostility and anger are commonly demonstrated toward the misidentified person, and affect is often blunted when the patient is speaking of the person believed to have been replaced.

CS usually subsides as the underlying medical condition responds to treatment or with treatment of associated psychotic symptoms. The syndrome has been reported to respond well to antipsychotic agents, including olanzapine (79) and sulpiride and trifluoperazine (13), as well as to drugs with neuroleptic properties, in particular pimozide (24,131,136). A



recent study reported the remission of CS with treatment with the antidepressant mirtazapine (137). In the cases reported here, delusions of misidentification ceased with treatment of olanzapine or risperidone.

## Conclusion

Epidemiologic studies of the prevalence of violent behaviour among people both with and without diagnosable mental illness have indicated that severe acts of violence are more prevalent among individuals with delusional disorders (103–106). It seems likely that the nature of the CS delusion and associated hostility heighten the potential for violence directed toward the misidentified person. This indicates an actual danger of violence from individuals with CS—a danger underscored by the relative frequency of reported severely violent acts, including homicide. Epidemiologic data indicate that male sex and substance abuse predict severely violent behaviour in patients with delusional disorders (138–141). When these features are present in patients with CS, the potential for violence may be further increased. As such, a psychiatric evaluation of individuals with suspected CS should include an assessment of the risk for violent behaviour. Specific questions should seek to identify the subject and nature of the delusions of misidentification. A greater awareness of the demographic and clinical features commonly reported in those cases of CS that involve assault may help in assessing the risk of violence toward others. The potential effectiveness of treating the underlying medical condition or associated psychotic symptoms underscores the importance of identifying a risk for violence. CS delusions that continue despite treatment may indicate an underlying organic illness (for example, 5,111,135). It is therefore important to collect biological and neuropsychological measures that may indicate the presence of organic dysfunction.

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## Résumé : Syndrome de Capgras : étude des corrélats neurophysiologiques et présentation des caractéristiques cliniques des cas de violence physique

**Objectif :** Des actes de violence ont été souvent rapportés dans des cas de syndrome de Capgras (SC), un syndrome de fausse identification caractérisé par la certitude délirante que des imposteurs ont remplacé des gens familiers de la personne. Le SC a été observé dans de nombreux troubles neuropsychiatriques et organiques, et les études de neuroimagerie indiquent une association entre le SC et les anomalies de l'hémisphère droit. Cependant, le SC a reçu une attention limitée du point de vue de la psychiatrie légale. Nous proposons que l'explication des données démographiques et cliniques notées dans les cas de violence attribuables au SC pourrait faire ressortir d'important facteurs de la progression du SC vers la violence.

**Méthode :** Nous examinons les corrélats neurophysiologiques et les facteurs cliniques observés dans le SC et présentons les caractéristiques d'une série de cas qui démontrent le potentiel de violence physique grave envers la personne faussement identifiée des patients souffrant du SC.

**Résultats :** Pour les patients souffrant du SC impliqués dans des voies de fait, nous présentons et discutons les caractéristiques démographiques et cliniques qui peuvent contribuer à un risque accru de violence.

**Conclusions :** Comprendre les caractéristiques cliniques qui se manifestent dans le SC et qui aboutissent à des actes violents pourrait aider les cliniciens à évaluer le potentiel de violence chez ces patients.